Driving The Evolution of Trusted, Connected Computing

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Intel Corporation
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Agenda

- What is “Trust”?
- Designing Security into the Computing Environment
- Privacy Considerations
- Policy Directions

Intel's Vision: A Trusted Connected World

- **Secure Virtual Enterprises**
  - "I can trust the Network with my business"
- **Trillions of *Trusted* Transactions**
  - "I can buy, trade, or sell anything on the Net"
- **Ubiquitous Digital Content**
  - "I can watch first-run movies over the internet"

Secure the Network, Platforms and Content

Top Security Concerns

Consumer:

- Malicious Code / Virus
- Privacy & Confidentiality
- Anonymity
- Ease of Use
- Know who you are dealing with on the Internet

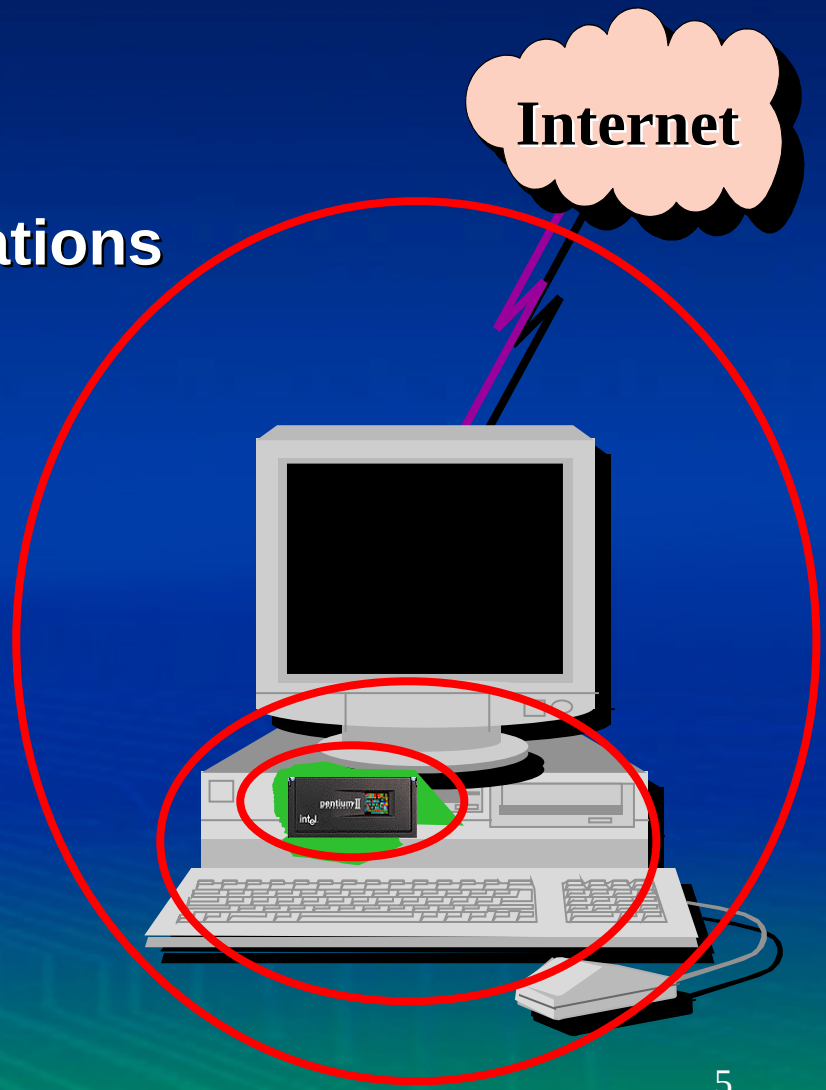
Business:

- Malicious Code / Virus
- Strong User Identification & Access Controls
- Extending network to remote employees, customers and suppliers
- Theft of Company Data
- Protecting information on the network

SOURCES:
•InfoTek Research Report 10/98
•Information Security Magazine - Security Survey 7/99
•CIS/FBI Security Report 1999

What Do We Need to Defend Against?

- Hacker over the network
  - Threat to secure communications
  - Spoofing, replay, denial of service
- Malicious code
  - Threat to local secrets
  - Viruses, Trojan horses
- Illegal copying and theft
  - Threat when “bits have value”

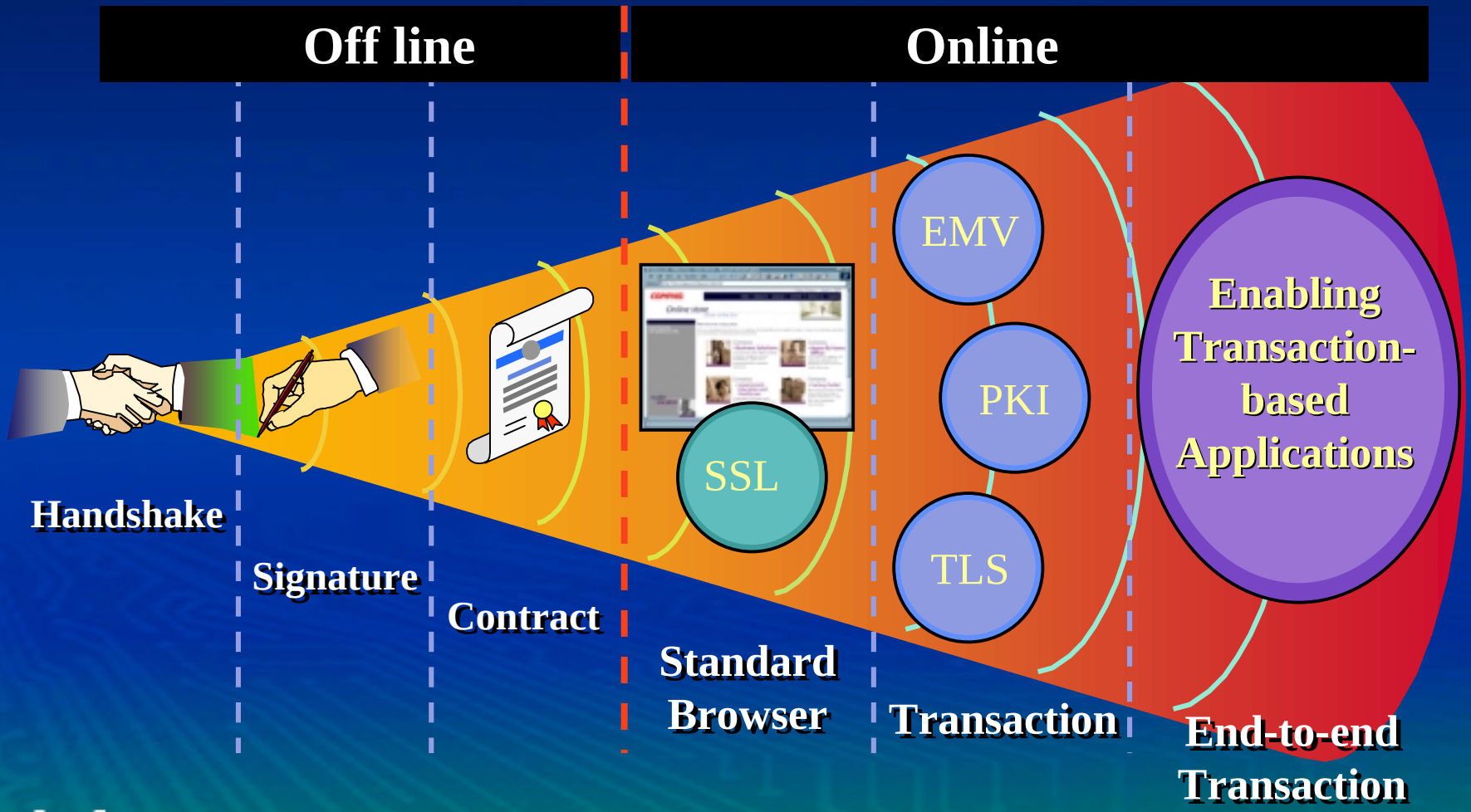


“Better Security” is a Challenge to Explain

- Internet commerce is growing wildly
- Many on-line users feel safe today
- Most executives believe their companies have good security
- Technology, policy, and user behavior all impact security

Security *and Privacy* Required for Trust

How We Establish Trust



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General Security View Today

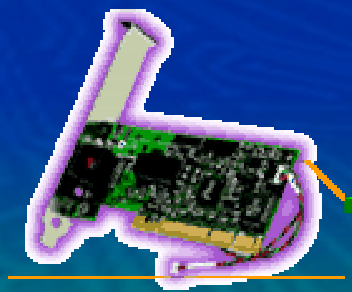
Enabling trust in e-Business

SSL: de facto protocol for web-based protected transactions

PKI/Dig.Certs: 50% migrate in 2yrs as primary means to user authentication

IPSec/VPN's: emerging standards for network security

Native OS support for Digital Certificates, smart cards, & IPSec



Windows* 2000

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Industry Actions Needed

- Set of baseline security features
  - TCPA
- Cost effective tokens and biometric capabilities
  - PC/SC (and other organizations)
- Privacy policies and practices
  - OPA, ISTPA

Trusted Computing Platform Alliance

- Objectives
  - Define scope of the problem and solution
  - Develop and release a specification
  - Encourage wide industry support and adoption of the solution
    - Must be exportable, ubiquitous over time
  - Ensure owner control of privacy

Support and Grow e-Business

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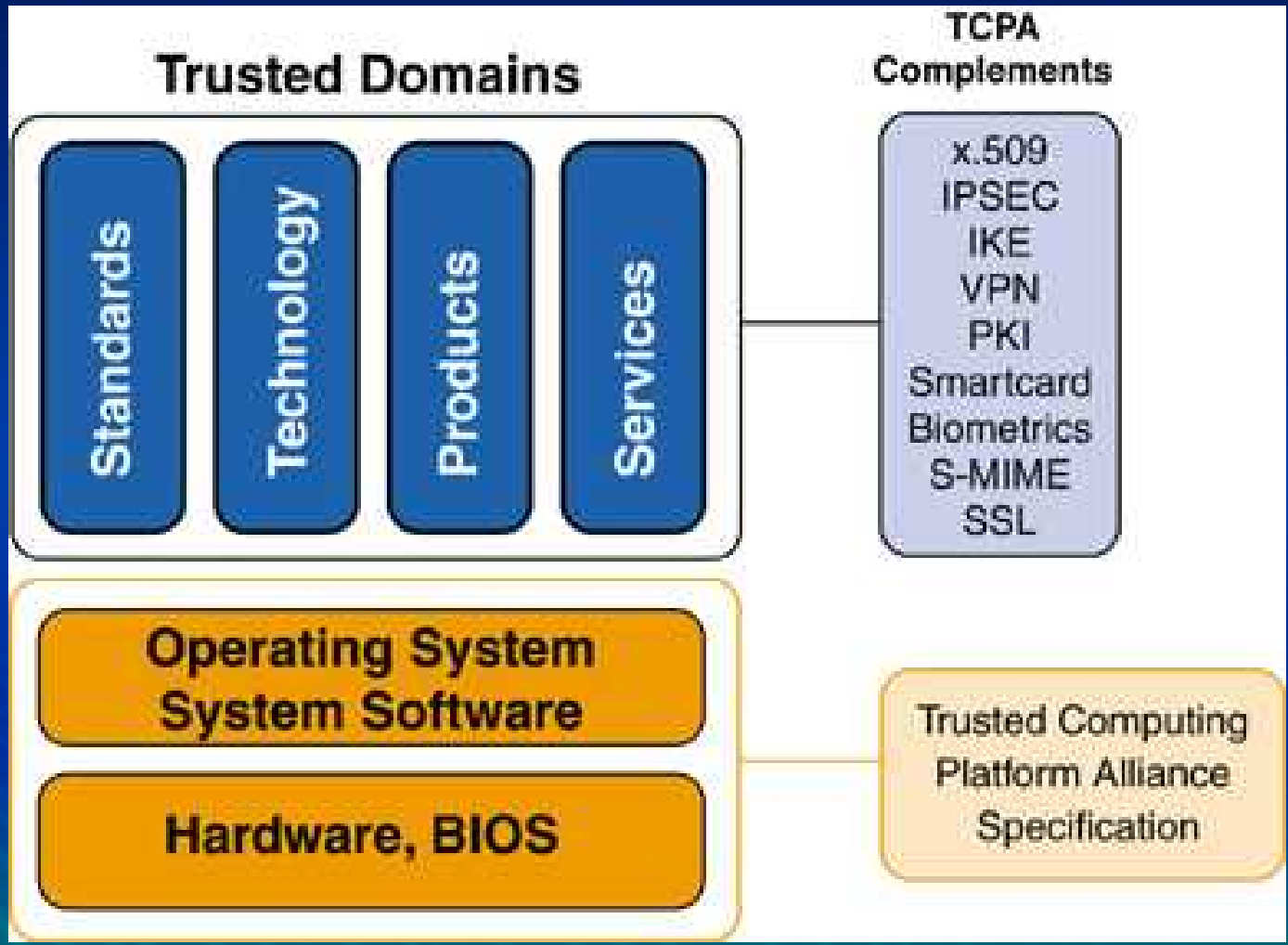
TCPA Specification Scope



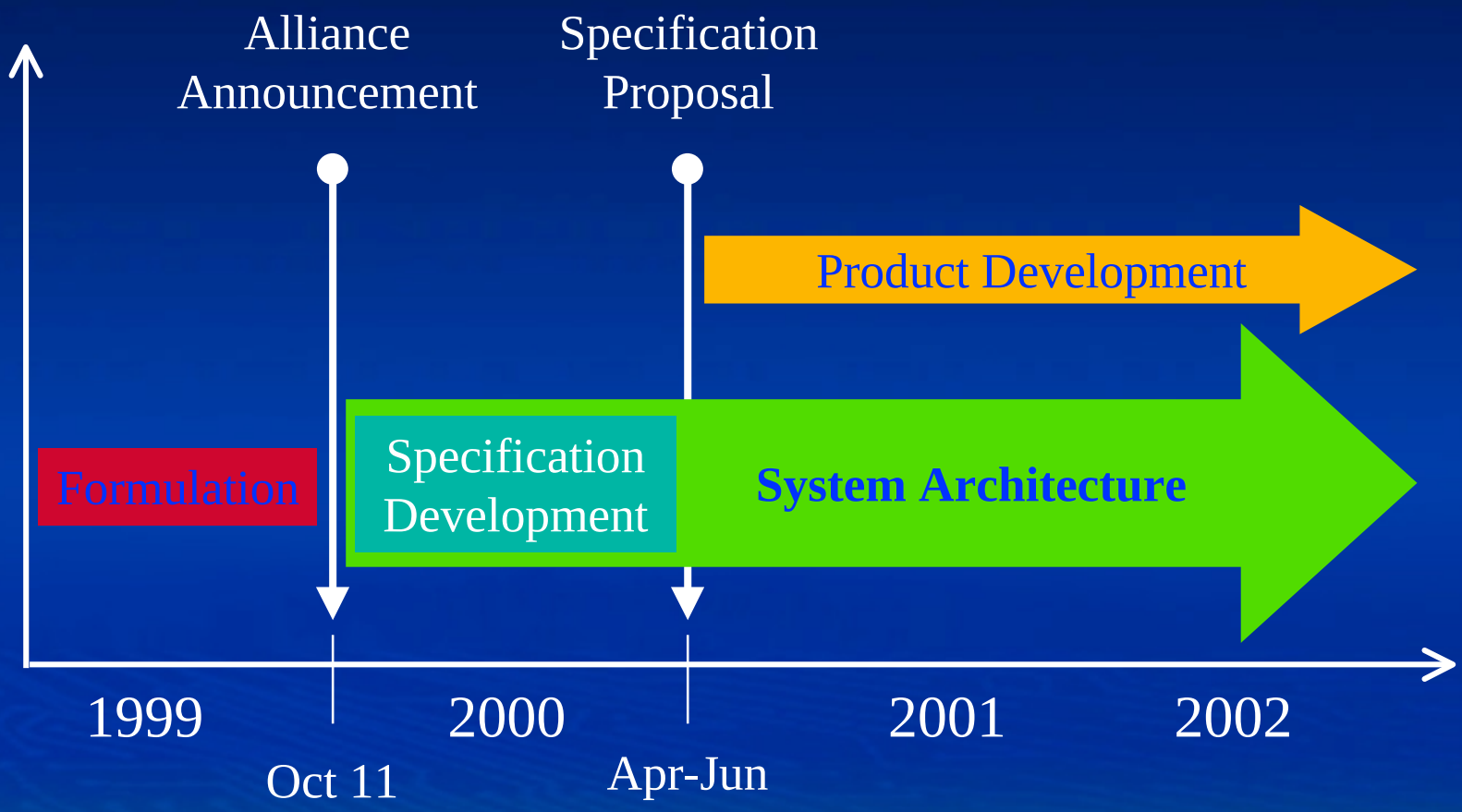
TCPA Specification Targets

- Security features proposed in V1.0
  - Protected storage of confidential information
  - Key Generation
  - Platform Authentication
    - Electronic signing of data
    - Hashing of data
  - Random number generation
  - Integrity metrics / challenge

Hardware + Software > Software Only

www.trustedpc.org

TCPA Timeline

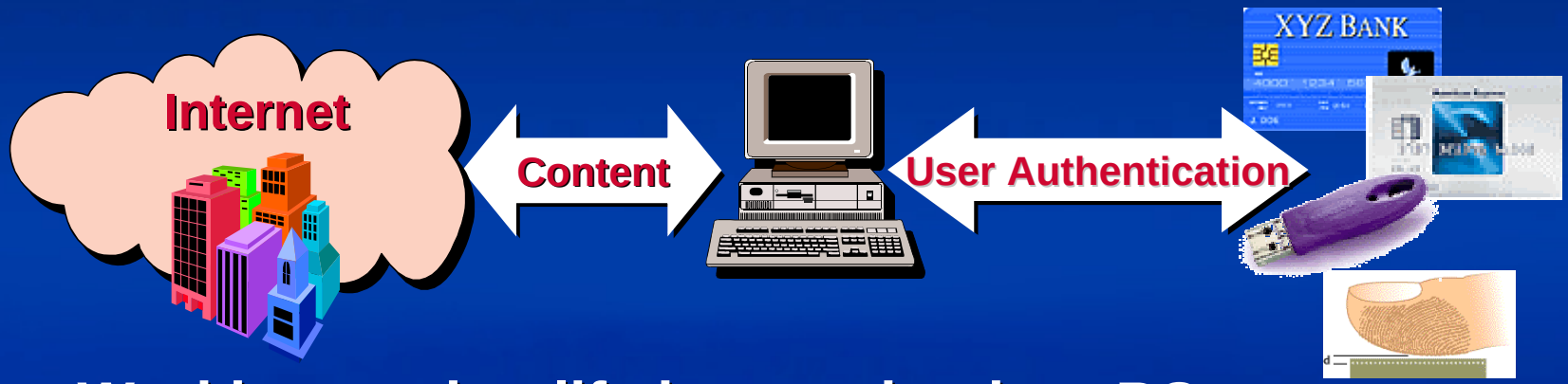


Currently at 80+ Members and Growing

**All dates provided are for planning purposes only and are subject to change

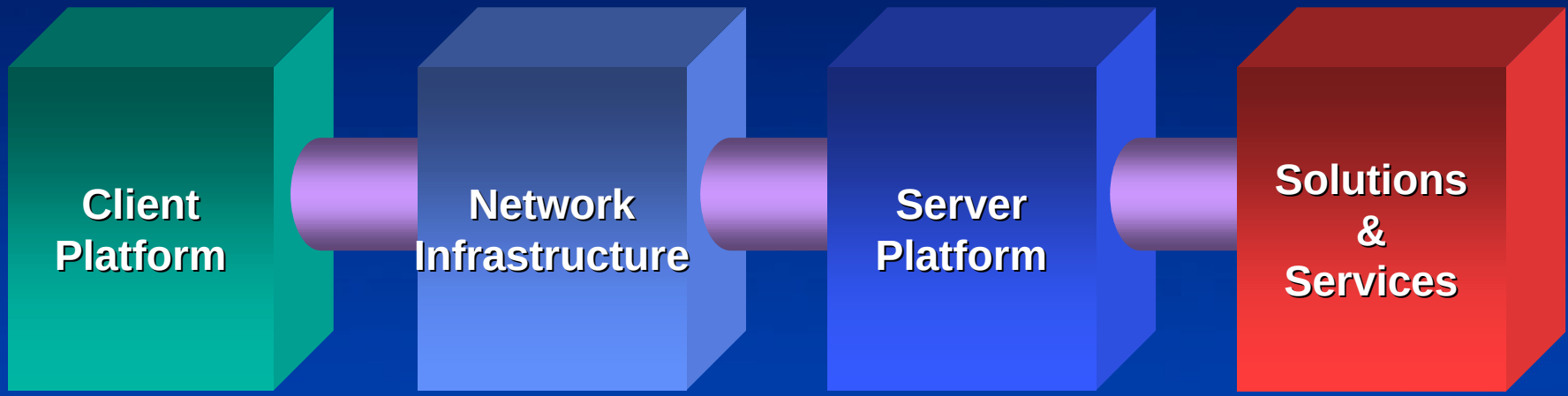
Smart Cards, Tokens, and Biometrics

- PC-complementary technologies
  - For Authentication, User ID, Access Control, Credential Storage



- Working to simplify integration into PC
  - TCPA, PC/SC Workgroup, BioAPI, Smart Card Forum
- Broad deployment requires:
  - Lower cost infrastructure
  - Compelling PC-based applications

Security is Core to Intel's Internet Building Blocks



- Intel® RNG
- BIS
- TCPA
- PC/SC

- IPSec NICs
- VPNs (Shiva)
- Commerce Equipment

- IA-32 & IA-64 Performance Enhancements

- Intel® Authentication Services
- Intel® Online Services
- Software Tools (CDSA)

Building Block Enablers
Clients & Servers

Physical Controls

Hood and cable locks
Smart cover lock
Security screws

Authentication/Confidentiality

IPSec
Intel® Random Number Generator
Biometrics
Smart Cards /Tokens

Firmware Controls

Boot Integrity Services
Passwords
*DriveLock**
QuickLock/QuickBlank**

Remote Management

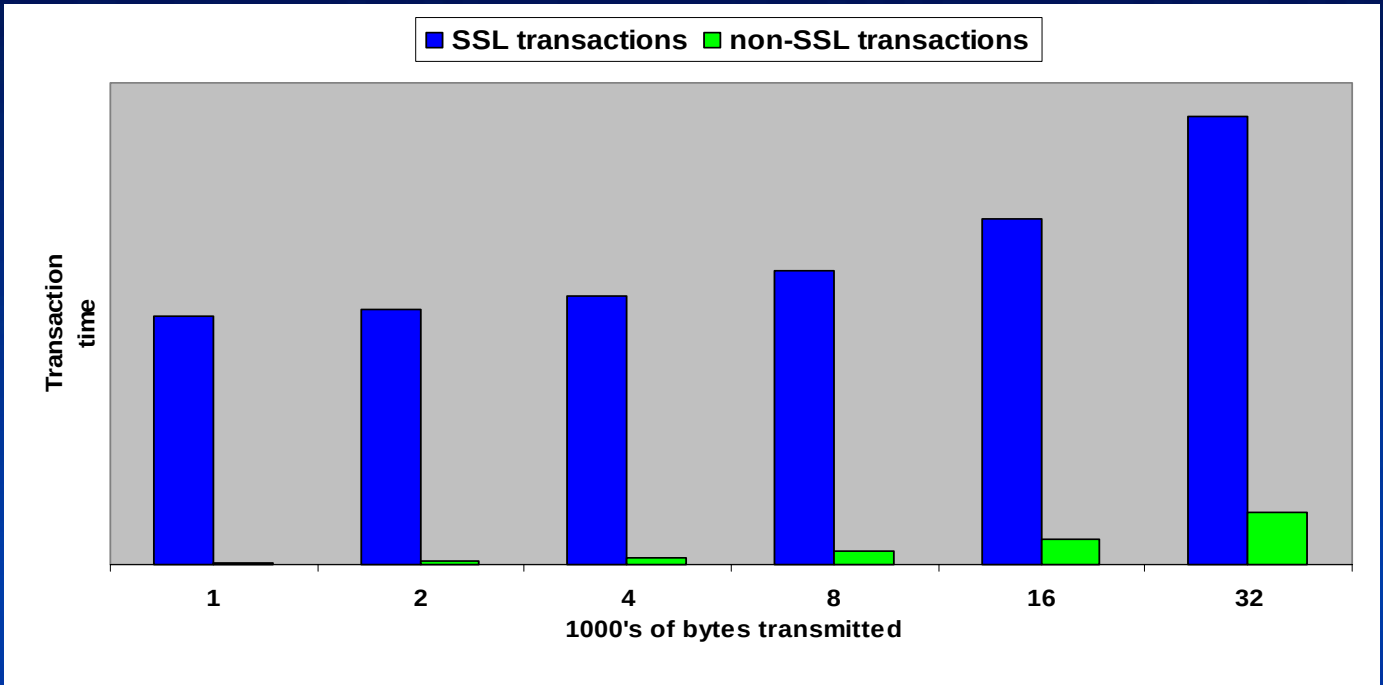
*Alert on LAN**
Chassis intrusion
Missing processor
Presence Heartbeat

Application Enabling

Security Middleware: CDSA

*Other brands and names are the property of their respective owners

SSL Puts a Big Load on Servers



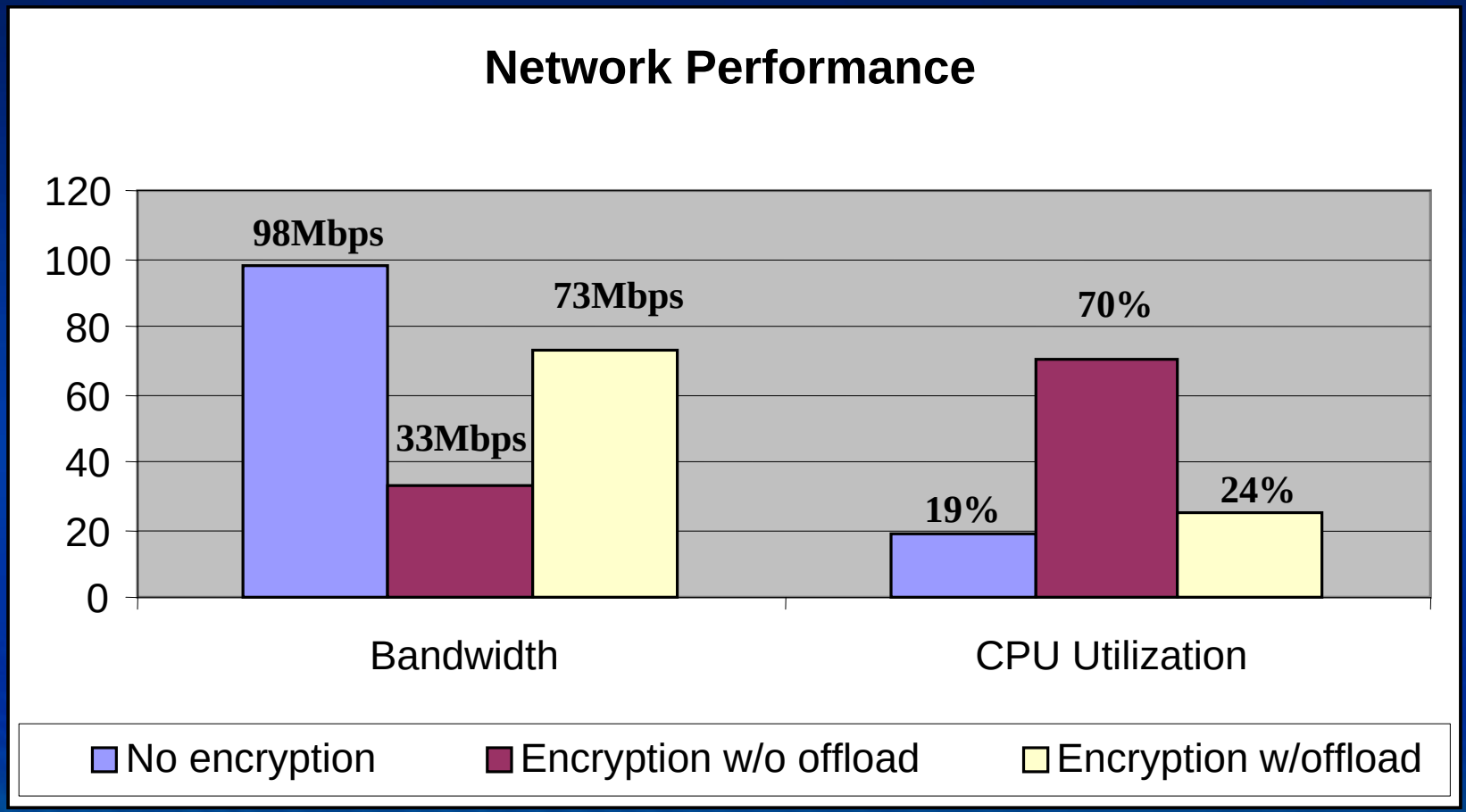
- Intel is developing faster processors with optimizations for security
- Intel® architecture-based servers have flexibility and scalability for demanding security applications

Source: Intel Lab research

Intel's Security-enabled NICs

- Just launched this week
- Uses innovative encryption co-processor
- Supports Windows2000* right of of the box
  - Drivers available for other OSs
- Accelerates IPSec encryption
  - Offloads to co-processor
  - Offloading encryption function speeds network performance

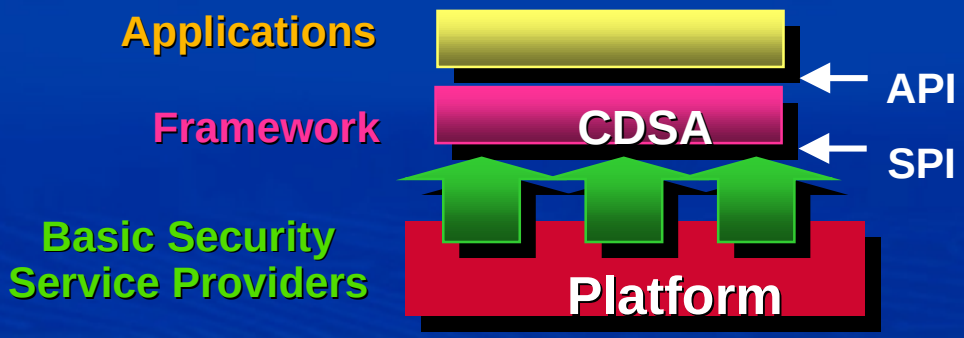
IPSec Performance



Source: Intel Labs, 1999

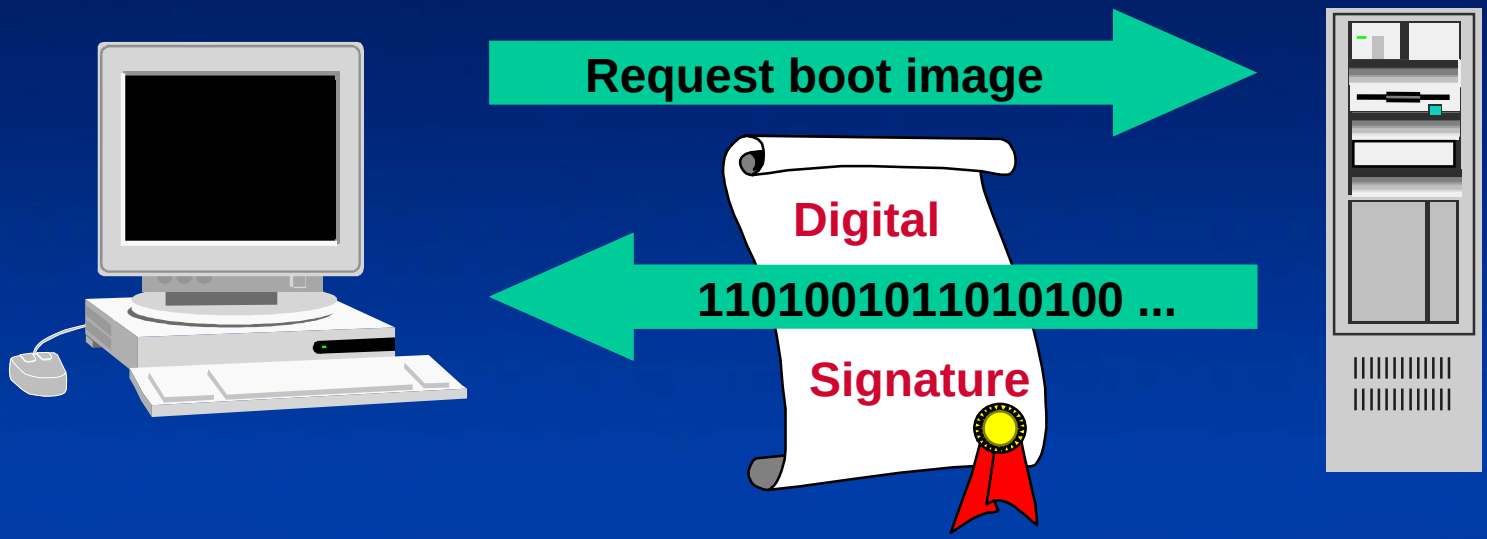
Common Data Security Architecture

- Open, interoperable, cross platform security infrastructure
- Over 5 years of R&D and industry review
- Version 2 Release 3.0 will ship in March



Peer-reviewed, Robust, and Ready for Broad Adoption

Wired for Management: Boot Integrity Services (BIS)



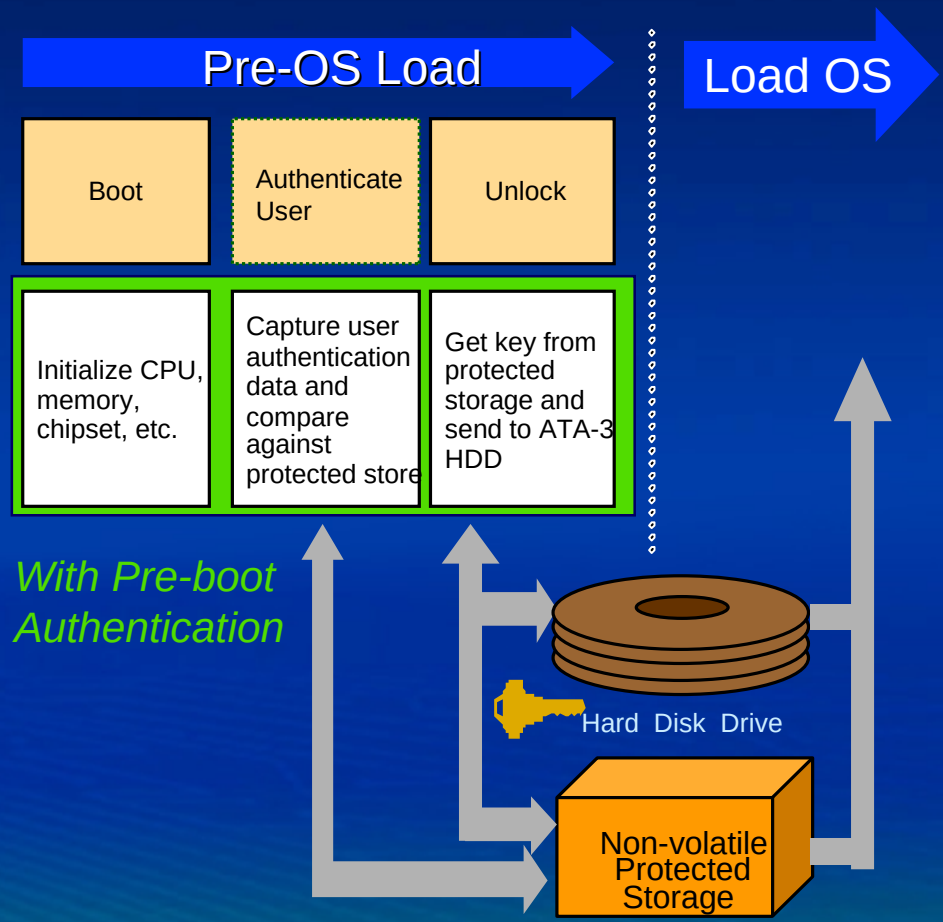
Boot image authentication

- Digital signature (public key) pre-stored in NV memory
- Downloaded program is accompanied by a digital signature (private key)
- BIS in the client performs verification

Increased Trust for Initial Software Download

Pre-boot Authentication

- Architecture and services to strengthen user authentication during boot-up
  - Supports multi-factor authentication
  - Creates a deterrent to notebook theft
  - Bus, token, and BIOS independent



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Privacy Was Top of Mind in '99

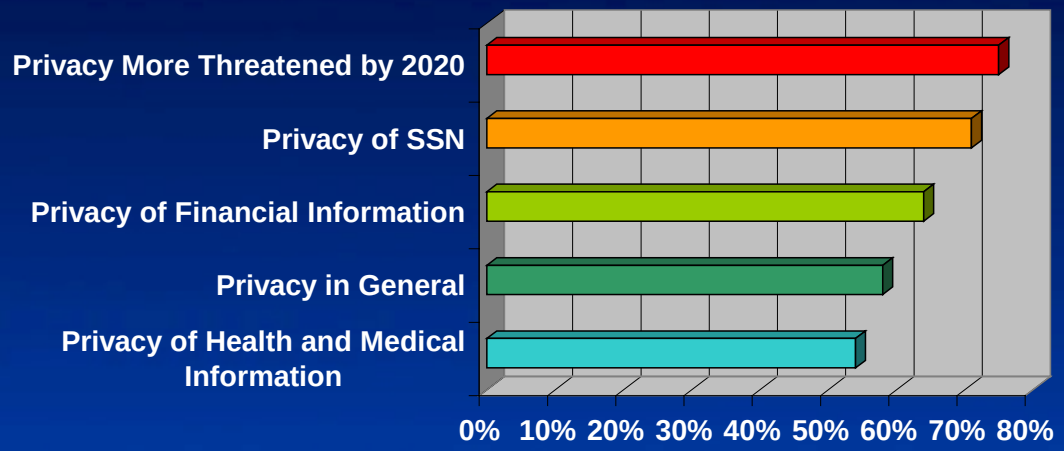
- And we helped…
- Privacy got the attention of various organizations
  - Government
  - Advocacy Groups
  - Media
  - Businesses

Privacy on the 'Net Remains a Concern

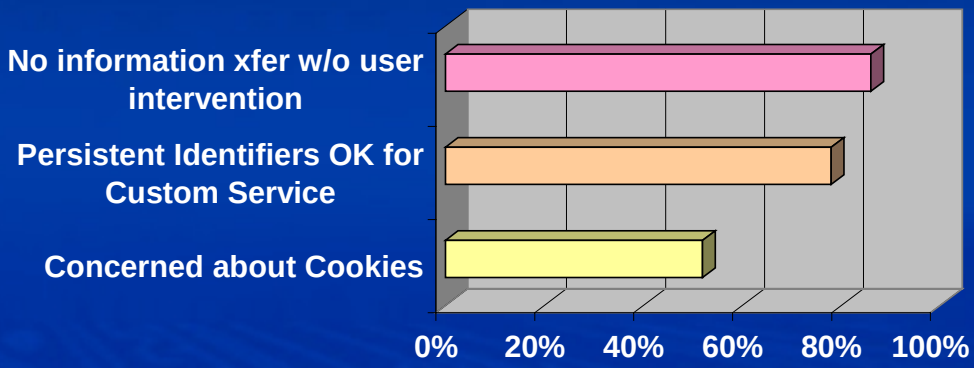
Privacy Data

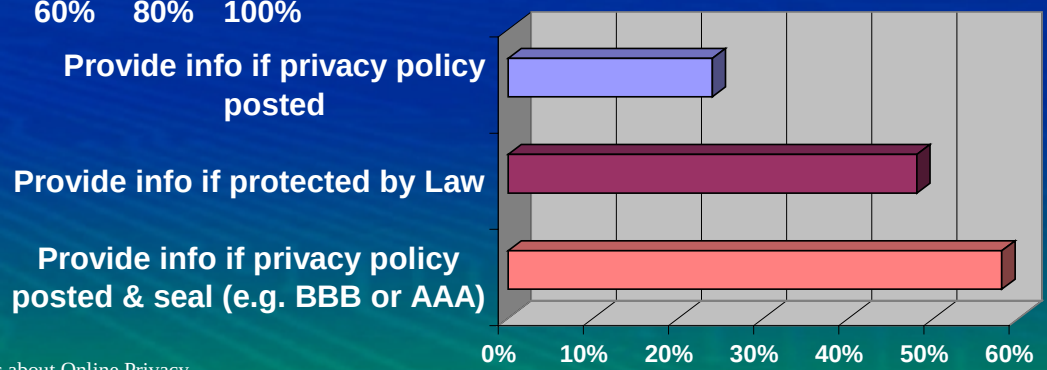
- Choose your source
  - Conclusion's the same

Consumer Attitudes on Privacy



Source: Consumers and the 21st Century
Conducted for: National Consumers League
Louis Harris and Associates, 1999





Source: Understanding Net User's Attitudes about Online Privacy
AT&T Labs - Research
Technical Report TR 99.4.3, April, 1999

Industry Action on Privacy

- Industry Working Groups

online privacy alliance

ISTPA
INTERNATIONAL SECURITY, TRUST AND PRIVACY ALLIANCE

Trusted Computing Platform Alliance

- Seal Programs

PRIVACY BBBONLINE

Kid's Privacy BBBONLINE

BBB RELIABILITY PROGRAM BBBONLINE

TRUSTe

- Online Advertising Programs

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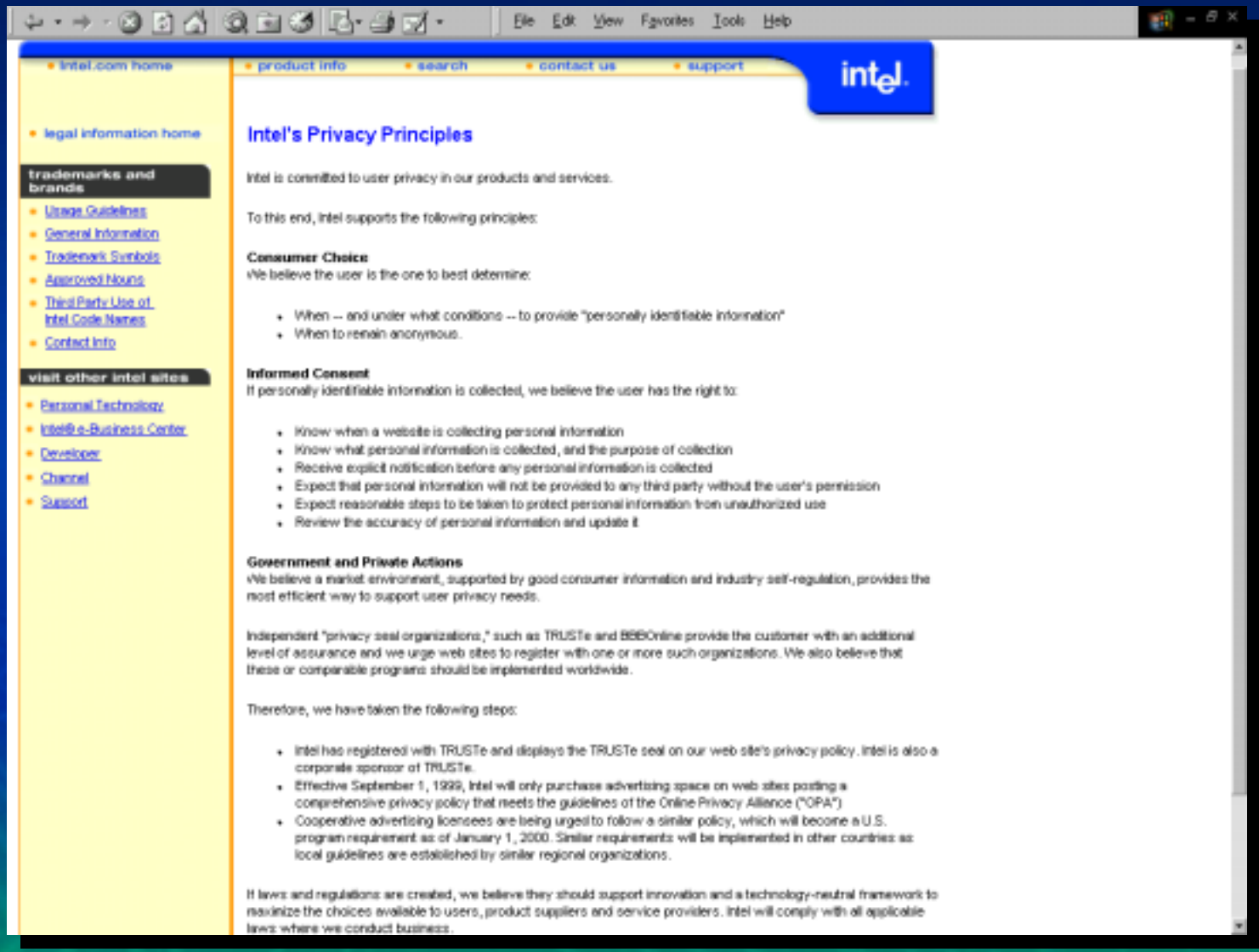
Europe and Privacy

- Recent Survey by Jupiter Communications:
  - About 75% of EU sites collect data
  - Only 10% of EU sites have Privacy Policy linked to home page
  - 89% of EU sites not confident of compliance with EU directive
  - EU consumers willing to trade data for benefits
  - Security and Trust still barriers to buying online

Consumer communication and education is good business worldwide

Source: Jupiter Communications, November 1999

Intel Privacy Principles



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Policy Considerations

- Government
  - Legislation
  - Export Controls
  - Technology
- Corporate
- User Awareness / Comfort
- Privacy

We must make [our critical systems] more secure so that America can be more secure.

- Bill Clinton, Jan 6, 2000

Legislation

- Self-regulation and market forces provide greatest flexibility
- Specification of capabilities offers much more flexibility than specification of technologies
- Technology limitations need to be comprehended when developing legal accountability of digital signatures

Technology Changes Continually

Summary

- Intel is designing security into Client, Server, and Network products as well as Services
- The industry is banding together and creating specifications for interoperability
- Privacy remains a user concern that must be considered in all products
- Export policies are improving - but security concerns are growing around the world

"It takes an industry to build a trusted, connected world"